In the claims:

1. (currently amended) A method ~~of fine synchronization~~ for synchronizing a receiver to a receive signal ~~(S)~~ corresponding to a reference signal ~~(TS)~~ transmitted in a transmission channel, ~~characterized in that it includes the following~~the method comprising the steps of:

- ~~selecting a source signal producing~~ analyzing the receive signal to obtain a characterization signal ~~(X, S) after it has passed through~~as a response of said transmission channel to a source signal,
- establishing a characterization matrix ~~(L)~~ for estimating ~~the~~ a covariance of said characterization signal ~~(X, S)~~,
- identifying dominant eigenvalues ~~which are the~~ as highest eigenvalues ~~(λ_i, λ'_i)~~ of the characterization matrix ~~(L)~~,
- calculating ~~the~~ a correlation function ~~(c(t), f(t))~~ of said source signal with ~~the~~ a sum of ~~the~~ eigenvectors ~~(v_i, v'_i)~~ respectively associated with said dominant eigenvalues, and
- ~~searching for the~~identifying a first maximum of the correlation function to synchronize the receiver~~(c(t), f(t))~~.

2. (currently amended) A method according to claim 1, ~~characterized in that the number (d, d') of~~ wherein the step of identifying the dominant eigenvalues ~~(λ_i, λ'_i)~~ ~~is~~ comprises identifying a predetermined number of highest eigenvalues of the characterization matrix.

3. (currently amended) A method according to claim 1, wherein the step of identifying the~~characterized in that the ratio of the sum of said~~ dominant eigenvalues comprises identifying as dominant eigenvalues a number of highest~~to the sum of all the~~ eigenvalues of the characterization matrix such that a ratio of a sum of said

highest eigenvalues to a sum of all the eigenvalues of the characterization matrix is greater than or equal to a predetermined number.

4. (currently amended) A method according to claim 1, further including a step of estimating ~~the~~ additive noise ~~(N)~~ in the transmission channel, ~~characterized in that said~~ and wherein the step of identifying the dominant eigenvalues comprises identifying as dominant eigenvalues a number of highest eigenvalues of the characterization matrix such that a sum of said highest eigenvalues~~are such that their sum~~ is less than or equal to ~~the~~ a sum of all the eigenvalues of the characterization matrix less ~~said~~ the estimated additive noise ~~(N)~~.

5. (currently amended) A method according to claim 4, wherein ~~characterized in that~~ the additive noise ~~(N)~~ is estimated by normalizing ~~the~~ instantaneous noise ~~(N_0)~~ ~~which is~~ evaluated by means of said receive signal ~~(S)~~, said reference signal ~~(TS)~~ and an estimate of ~~the~~ an impulse response ~~(X)~~ of the transmission channel.

6. (currently amended) A method according to claim 5, wherein ~~characterized in that the expression for~~ the instantaneous noise [[( ]] N_0 [[ )]] is obtained as

$$N_0 = S - A.X$$

where A denotes ~~the~~ a transmission matrix associated with said reference signal ~~(TS)~~, S denotes said receive signal and X denotes said impulse response.

7. (currently amended) A method according to claim 6, further comprising the step of averaging the estimated~~characterized in that said~~ additive noise ~~(N) is also averaged~~.

8. (currently amended) A method according to ~~any of~~ claims 1, wherein ~~to 7, characterized in that~~ said characterization matrix ~~(L)~~ is ~~the result of~~obtained via a smoothing operation.

9. (currently amended) A method according to ~~any preceding~~ claim 1, ~~characterized in that~~ wherein said characterization signal is obtained as an estimate of ~~the~~ an impulse response ~~(X)~~ of the transmission channel.

10. (currently amended) A method according to ~~any of~~ claims ~~1, to 8, characterized in that~~ wherein said characterization signal is obtained as said receive signal ~~(S)~~.

11. (new) A synchronization device for synchronizing a radiocommunication receiver to a receive signal corresponding to a reference signal transmitted in a transmission channel, the device comprising:

- means for analyzing the receive signal to obtain a characterization signal as a response of said transmission channel to a source signal,
- means for establishing a characterization matrix for estimating a covariance of said characterization signal,
- means for identifying dominant eigenvalues as highest eigenvalues of the characterization matrix,
- means for calculating a correlation function of said source signal with a sum of eigenvectors respectively associated with said dominant eigenvalues, and
- means for identifying a first maximum of the correlation function to synchronize the receiver.

12. (new) A synchronization device according to claim 11, wherein the means for identifying the dominant eigenvalues comprise means for identifying a predetermined number of highest eigenvalues of the characterization matrix.

13. (new) A synchronization device according to claim 11, wherein the means for identifying the dominant eigenvalues comprise means for identifying as dominant eigenvalues a number of highest eigenvalues of the characterization matrix such that a ratio of a sum of said highest eigenvalues to a sum of all the eigenvalues of the characterization matrix is greater than or equal to a predetermined number.

14. (new) A synchronization device according to claim 11, further comprising means for estimating additive noise in the transmission channel, and wherein the means for identifying the dominant eigenvalues comprise means for identifying as dominant eigenvalues a number of highest eigenvalues of the characterization matrix such that a sum of said highest eigenvalues is less than or equal to a sum of all the eigenvalues of the characterization matrix less the estimated additive noise.

15. (new) A synchronization device according to claim 14, wherein the means for estimating additive noise comprise means for normalizing instantaneous noise evaluated by means of said receive signal, said reference signal and an estimate of an impulse response of the transmission channel.

16. (new) A synchronization device according to claim 15, wherein the instantaneous noise N_0 is obtained as

$$N_0 = S - A.X$$

where A denotes a transmission matrix associated with said reference signal, S denotes said receive signal and X denotes said impulse response.

17. (new) A synchronization device according to claim 16, further comprising means for averaging the estimated additive noise.

18. (new) A synchronization device according to claim 11, further comprising smoothing means to obtain said characterization matrix.

19. (new) A synchronization device according to claim 11, wherein said characterization signal is obtained as an estimate of an impulse response of the transmission channel.

20. (new) A synchronization device according to claim 11, wherein said characterization signal is obtained as said receive signal.